

TRANSISTORIZED

PARALLEL-TO-SERIAL CONVERTER

Series 5010

The EAI Series 5010 Serializer is a self-contained solid-state device for high-speed conversion of parallel digital data into serial form for driving serial recording equipment.



versatility

... compatible with the complete line of EAI digital instruments ... selection of up to 19 input codes and 14 character output words are available ... plug-in patching block permits rapid change of format.

high-speed

... up to 240 characters per second output

reliability

... fully-transistorized circuits drive mercury-wetted output relays

The Series 5010 Serializer is a compact, portable or rack mounted, self-contained device designed to accept parallel inputs from EAI all solid-state Series 5000 and 5001 Digital Voltmeters, Series 5002 AC/DC Digital Voltmeter, Series 5100 and 5101 Digital Voltohmmeters and Series 5003 AC/DC/Ohms Digital Multimeter; and to convert these signals into serial data for driving paper tape punches, electric typewriters, and similar alphanumeric serial recording equipment. Output compatible with a 12-line IBM card punch is available as an optional accessory.

EAI[®]

ELECTRONIC ASSOCIATES, INC. Long Branch, New Jersey

The Series 5010 Transistorized Parallel-to-Serial Converter

THEORY OF OPERATION

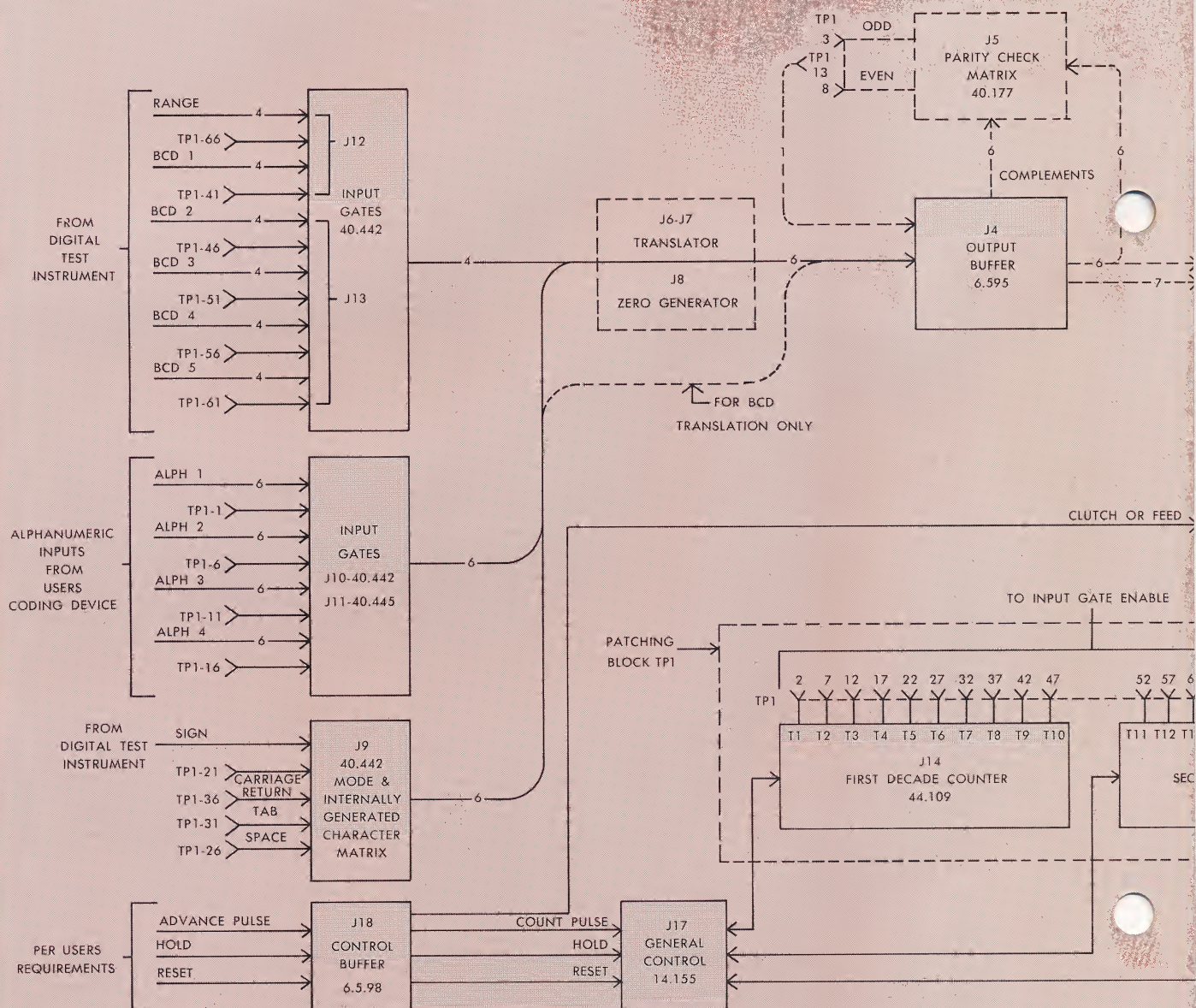
The Series 5010 Serializer contains a number of plug-in etched circuit cards arranged to perform the functions indicated in the block diagram. The components shown in dotted lines are available as optional equipment.

Parallel Binary-coded decimal (BCD) data from the digital voltmeter or similar source, and the alphanumeric coded data from other external equipment are applied to the *Input Gates*. The INPUT GATE EN-

ABLING lines (shown below each data input) are terminated on a patching block (TP1). Upon application of a positive advance pulse, the desired information is serialized in the pre-programmed sequence.

In the standard Series 5010 Serializer three internally generated characters are available. Typical internally generated characters are TAB, CARRIAGE, RETURN and SPACE. The MODE character representing AC,

5010 SERIALIZER BLOCK DIAGRAM



OHMS, + or -, is determined by the input from the digital test instrument. The ENABLE signal for each character is terminated on patch block TP1.

SERIALIZER OPERATION IS CONTROLLED BY THREE IDENTICAL COUNTERS:

the *First Decade Counter*, the *Second Decade Counter* and the *Column Counter*.

THE SEQUENCE OF OPERATION IS AS FOLLOWS:

an ADVANCE pulse is applied to the *Control Buffer* which produces a COUNT pulse to the *General Control* circuits, and a delayed CLUTCH or FEED signal to the *Output relays*. (This ADVANCE pulse is given by the *Advance push-button* in Manual Mode, or by external equipment—output device, input device, special clock, scanner, etc. in Automatic Mode). The slowest device in the system—most often the typewriter or tape punch—usually determines the rate of operation.

HOLD and RESET signals also are applied to the *Gen-*

eral Control circuits through the *Control Buffer*. These circuits transmit COUNT pulses to the appropriate counter, reset all counters on command or alter a complete cycle of operation on command. The counter outputs are terminated on patching block TP1, and are used to enable the *Input Gates* and the *Mode* and *Internally Generated character Matrix*.

The Characters generated are enabled in the order pre-programmed on the patching block TP1, and are transmitted to the *Output Buffer*. If translation or zero generation is desired, the appropriate *Translator* or *Zero Generator* circuits are inserted between the *Input Gates* and the *Output Buffer*. With translation, any four bit BCD input can be translated to any desired 4, 5 or 6 bit output code and up to 9 alpha-numeric inputs may also be translated to any desired output code.

If a parity bit is desired, the *Output Buffer* transmits the six data-bits and their complements to the *Parity Check Matrix*. This matrix produces both an odd and an even parity bit which are terminated on the front patch panel.

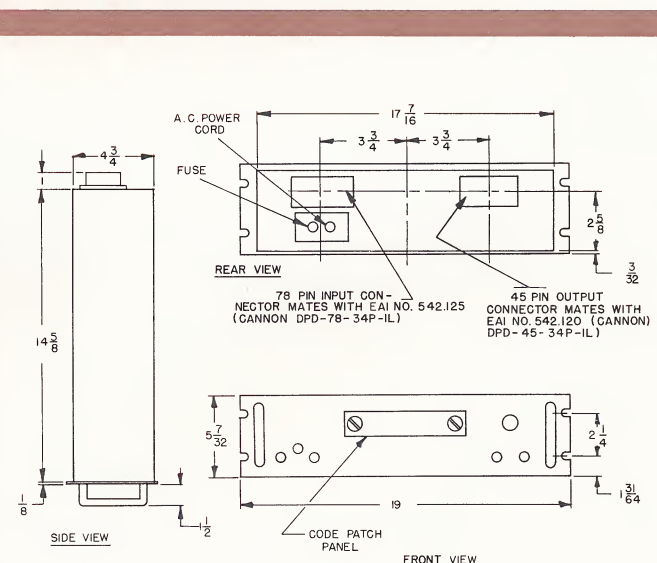
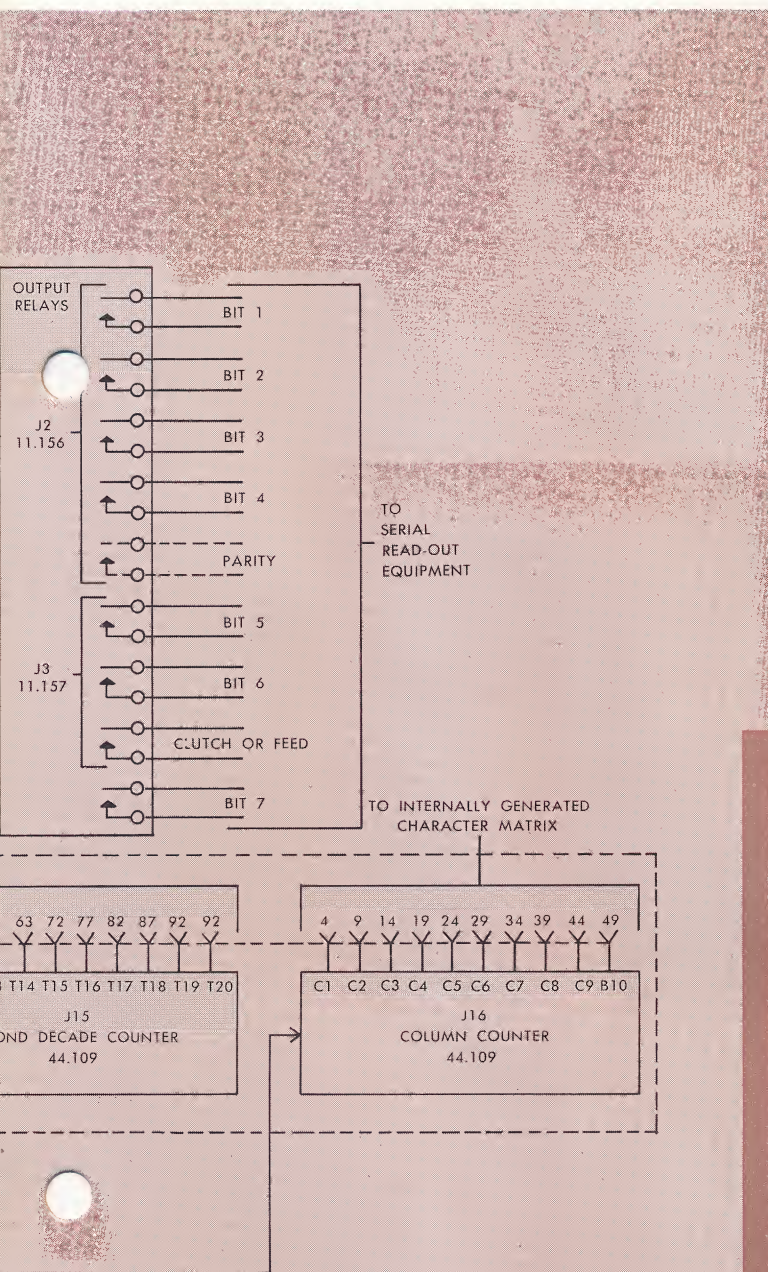
The six or seven bit character from the *Output Buffer* is then applied to the *Output relays*. The ADVANCE pulse which stepped the *Counter* to enable this character is delayed and thus produces a CLUTCH or FEED signal which causes the output device to record the character stored in the relays.

The *Column Counter* advances on the last count in each output word and counts the number of words up to a pre-patched number (ten maximum). The output of this counter can be used to initiate a CARRIAGE RETURN after the programmed number is reached. The counter resets to zero after each sequence.

PROGRAMMING

The Series 5010 Serializer is normally supplied factory wired, patched, and tested to fulfill the specified requirement of the user.

The versatility of this instrument insures against obsolescence and permits simple field modification to accommodate variable data format and a variety of peripheral equipment through its complete programming capabilities.



Dimensional drawing of series 5010

specifications

INPUT

Input Signal	Number of Groups	Lines Per Group	ON Signal Level	OFF Signal Level	Input Impedance
BCD Data	5	4	-5.5 to -14V or Open Circuit	-1 to +14V	ON = 200K to -6V OFF = 12K to -12V
Alpha-Numeric Data	4	6	-5.5 to -14V or Open Circuit	-1 to +14V	ON = 200K to -6V OFF = 12K to -12V
Mode Data	1	4	-1 to +14V	-5.5 to -14V or Open Circuit	ON = 1.2K to -12V OFF = 1.2K to -12V
Range Data	1	4	-1 to +14V	-5.5 to -14V or Open Circuit	ON = 6K to -12V OFF = 200K to -6V
Advance Pulse	1	1	\pm GND through 300 ohms max.	-10 \pm 2V or Open Circuit	2K to -12V
Hold	1	1	-1 to 14V	-5.5 to -14V or Open Circuit	4K
Reset	1	1	Capacitively coupled 10V positive step with 10 mi- crosecond max. rise time		500 shunted by 0.04VF

OUTPUT

Up to 9 mercury-wetted relay contact closures.
Rated at 2 amps maximum, 500 volts maximum
and 100VA maximum.

OUTPUT CODES

BITS PER CHARACTER

- 4, 5, 6 or 7 bits
- 4, 5, 6 or 7 bits plus parity
- 4, 5, 6 or 7 bits plus parity and clutch or feed

CHARACTERS PER OUTPUT WORD

Up to 14 characters

OUTPUT WORD FORMAT

Each character individually specified

POWER REQUIREMENTS

105 - 125 volts 50/60 cps

OPERATING TEMPERATURE RANGE

55 to 100 deg. F

WEIGHT

For rack mounting: 20 lb.
With case: 35 lb.

front panel controls and indicators

CONTROL

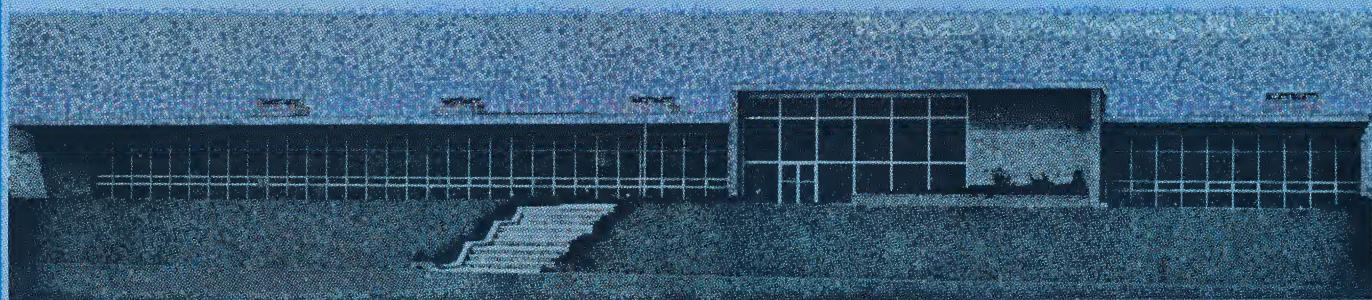
FUNCTION

- | | |
|----------------|---|
| POWER | Toggle switch for control of primary power; indicator lamp lights when switch is in ON position. |
| MODE | Two-position switch for control of overall operation: in MANUAL position, front panel pushbutton switches control STEP and RESET functions; in AUTO position, external equipment controls instrument. |
| ADVANCE | Push-button switch for step control of programmed sequence. |
| RESET | Push-button for reset control of programmed sequence. |

specifications subject to change without notice.

EAI®

ELECTRONIC ASSOCIATES, INC. • INSTRUMENT DIVISION



ELECTRONIC ASSOCIATES, INC., INSTRUMENT DIVISION, Long Branch, New Jersey, Tel. 201-229-4400, TWX 510-239-9208

THE COMPANY

Electronic Associates is a multi-million dollar company which has developed a line of XY Recording Equipment both Digital and Analog second to none. The Digital Voltmeter line originally conceived for use in the Analog Computer field now finds wide acceptance in the instrument business.

THE PRODUCT

A complete line of XY Recording Equipment both Digital and Analog having compatability with Data Reduction Equipment; a line of Digital Voltmeters suitable for small data acquisition use and necessary accessories.

ORDERING INFORMATION

TERMS: Net 30 Days
F.O.B. Point: Long Branch, N. J.
WARRANTY: 1 Year
HOW SHIP: Truck or Air
SPECIAL PAINT: Contact EAI Instrument Division
EXTRA MANUALS: Prices vary —
Contact EAI Instrument Division
All prices and specifications subject to change without notice



all solid state digital voltmeters
Series 6000 and 6001

SERIES 6000 AND 6001

CONSTANT 1 MILLISECOND CONVERSION TIME

Whenever the Series 6000 or 6001 receive a conversion command, the instruments make a new measurement which is independent of the previous reading. The logic system used to make a conversion requires 16 trials for each new reading. There are four binary coded decimal (8, 4, 2, 1) resistors per decade and a logic system determines whether each of these resistors should be dropped or retained for a given reading. Therefore, only four trials are needed per decade and 16 trials per reading. These trials proceed at a minimum clock rate of approximately 22KC to give 16 trials plus command signals for one complete reading every millisecond.

TRIGGER RATES

The Series 6000 and 6001 make conversions in 1 millisecond, but the number of these conversions per second is determined by the trigger rate.

A front panel switch permits the operator to select two readings per second, 50 or 60 readings per second (depending on line frequency), manual trigger (a front panel push button initiates a single reading) or external (trigger from a system or from the internal clock at 1000 conversions per second).

TRACK AND READ VARYING SIGNALS

The Series 6000 and 6001 will track an input voltage and allow the user to follow the change visually or through the data outputs. Since the instruments take a completely new reading which is independent of null, they can be used to provide a series of accurate readings of a varying signal.

ACCURACY, RESOLUTION AND STABILITY

The Series 6000 and 6001 digital voltmeters are calibrated to $\pm 0.01\%$ of reading plus 1 digit absolute accuracy and provide full accuracy and 100 microvolt resolution at the 1000 conversion per second rate.

The accuracy of the Series 6000 and 6001 is designed into the instrument and based on proven reliable circuits. The maximum absolute error over a minimum of 6 months is guaranteed not to exceed $\pm 0.01\%$ of full scale plus 1 digit. This 6 month stability guarantee covers all factors which might contribute to error over the full operating temperature and humidity range, on all ranges and at all trigger rates. It takes into consideration linearity, internal zener reference, input and switching networks and even the factory calibration source.

No complex calculations are necessary to determine the accuracy of a particular reading, since the accuracy specification applies to all ranges and under all rated operating conditions.

Drift-Free Internal Reference

A stable voltage source consisting of a zener diode regulating network (with a temperature coefficient of 0.001% per °C and enclosed in a thermostatically controlled $\pm 1^\circ$ oven for maximum stability) connected across an electronically regulated +40 volt supply is applied to the input of a chopper stabilized operational amplifier. The amplifier is placed in series with a -100 volt supply (to enable the amplifier to handle the load requirements) and a feedback resistor is placed across the series combination. The ratio of input and feedback resistance causes the amplifier to adjust itself to produce precisely -100 volts output. The internal reference is calibrated with a test set which is referenced to a group of saturated mercury standard cells whose certified accuracy is 0.0001%.

"FULL TIME" HIGH INPUT IMPEDANCE

Unlike conventional chopper input voltmeters, the high input impedance of the Series 6000 and 6001 remains constant since it does not depend upon a null condition within the instrument. Through the use of a unique dual amplifier input unloading circuit, inputs from high source impedances can be measured with full assurance that no inaccuracies occur due to loading effects.

PROGRAMMING AND DATA OUTPUTS

The Series 6000 is designed to be completely programmed within a digital data acquisition system or partially programmed for special applications (i.e.: track and hold). One 78 pin data connector on the rear of the instrument contains all programming lines as well as binary coded decimal outputs and complements. Thus, in addition to the rear signal input connector, one connector serves for the majority of high speed data logging and systems applications. A second 78 pin connector at the rear of the instrument provides ten line decimal outputs.

The Series 6001 is identical to the Series 6000 with the added capability of automatic ranging.

DISPLAY

A new 5 digit In-Line in-Plane projection display provides four (4) times the brilliance of earlier units. This type of readout has generally been acknowledged as the easiest and least fatiguing to read. The display is easily read even under high ambient light conditions.

SYSTEM ACCESSORIES

A complete line of input/output accessories are available for use with the Series 6000 and 6001 digital voltmeters. Included are input scanners, signal conditioners, a digital computer, printers and parallel-to-serial converters to drive tape and card punches. Write or call your EAI representative for information.

RANGES AND INPUT IMPEDANCE—SERIES 6000 AND 6001

Range (Volts)		Input Impedance (Megohms)*	
Nominal	Overrange	Constant	Maximum
1	1.1999	10	250
10	11.999	10	500
100	119.99	10	10
1000	1199.9	10	10

INPUT CIRCUIT

Front and rear panel input connectors permit convenient use either in a system or on a work bench. Signal pair may be floated up to 500 volts above chassis ground. Triaxial input connectors provide excellent signal pair shielding.

* A front panel switch permits the selection of either constant input impedance or maximum input impedance. In the maximum position, an internal adjustment permits setting the input circuit to greater than 1000 megohms on the 1 and 10 volt ranges.

Series 6000 Manual and Programmable Ranging

Selection of ranges accomplished by a front panel switch or remote circuit closures to ground, applied at rear programming connector.

Series 6001 Manual, Programmable, and Automatic Ranging

In addition to manual or remote programmed ranging, the Series 6001 provides complete automatic ranging capability. The automatic ranging mode is selected by a front panel switch or remote circuit closures to ground, applied at the rear programming connector.

Range Change Points.

Upranges at 120% of full scale.
Downranges at 10% of full scale.

Range Change Time

Range change time is 390 milliseconds (includes polarity change).

MAXIMUM CONVERSION TIME

Constant one (1) millisecond per measurement in a single range and polarity; 35 milliseconds worst case with polarity change and 390 milliseconds in automatic ranging mode with both range and polarity change.

The internal clock operates between 22 Kc for 1 millisecond conversion time and 28 Kc for .7 millisecond conversion time. The minimum clock rate is 22 Kc for a maximum conversion time of 1 millisecond.

TRIGGER AND DISPLAY RATE

A front panel trigger switch permits the selection of four different reading (trigger) modes.

Internal Low: Provides approximately 2 readings per second. Each measurement is made in the time specified under maximum conversion time above and displayed for the remainder (conversion in 1MS and display for 499 MS).

Internal High: Provides 60 or 50 readings per second (with conversion in 1 MS and display for 16 MS or 19 MS) depending on line frequency.

External: Provides conversion at an externally selected rate up to 1000 per second. The 1000 conversion per second rate can be triggered by an internal clock, which is available on the programming connector at the rear of the instrument.

Manual: Converts in 1 MS and displays until the manual push button is depressed, at which time another conversion occurs.

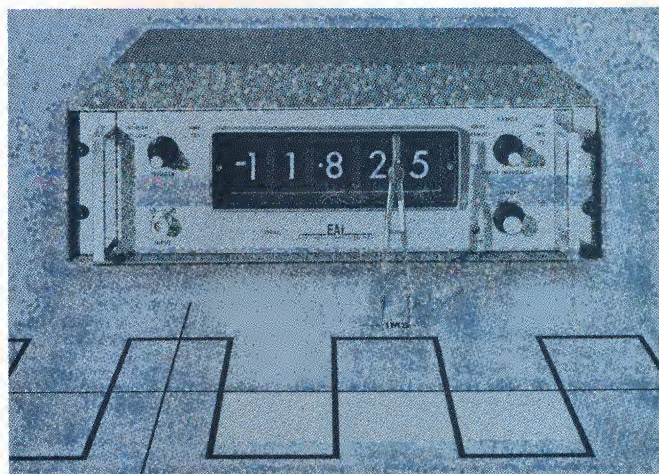
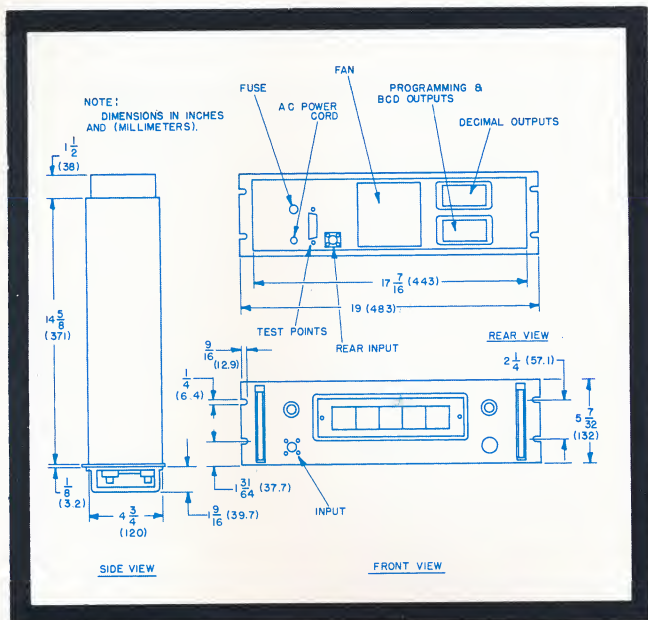
ELECTRICAL OUTPUTS

Complete systems output and control connections are available on two connectors at the rear of the instrument. Binary coded decimal outputs and programming lines are available on one 78 pin connector and decimal outputs are available on another 78 pin connector.

Binary Coded Decimal Outputs

BCD outputs are 8-4-2-1 logic

DIMENSIONS - Series 6000 and 6001



POWER

115/230 volts $\pm 10\%$, 50 to 60 cps, approximately 100 watts, 120 VA.

WEIGHT

Net wt. 31 lbs. (14 Kg); shipping wt. 50 lbs. (23 Kg).
When ordered with optional cabinet: Net wt. 44 lbs. (20 Kg); shipping wt. 57 lbs. (26 Kg).

PANEL FINISH

Light beige baked enamel. Black control titles and black bezel and controls with brushed aluminum handles and trim.

OPTIONS

(Order by underlined description)

Programmable Filter #1—Provides 60 DB of common and normal mode rejection at 60 cps—1 second settling time. Price \$195.00

Programmable Filter #2—Provides 40 Db of common and normal mode rejection at 60 cps—300 milli-seconds settling time. Price \$195.00

Protective Case for benchtop use Price 45.00

Special paint finishes available on request

ACCESSORIES

(Order by Stock Number)

Extender Board (for servicing plug in circuit boards). EAI Stock No. 51-160. Price \$25.00

Programmer Input and BCD Data Output Connector

(Cannon DPD-78-34-1L) 78 pin connector EAI Stock No. 542-125. Price \$7.90

Decimal Data Output Connector (Cannon DPD-78-34P-1L) 78 pin connector. EAI Stock No. 542-125. Price \$7.90

Cover Hood for Connectors Above (Cannon DPD-34J/s-12172) EAI Stock No. 198-161. Price \$2.00

PRICES

SERIES 6000
Manual and Programmable Ranging Digital Voltmeter \$2,950

SERIES 6001
Automatic Manual and Programmable Ranging Digital Voltmeter \$3,450

Instruments are supplied with chassis shields and input connector and cable.

high speed printer accessory



SYSTEM SPECIFICATIONS Series 6610

PRINTING FORMAT

Prints 10 characters per inch across the paper and 6 lines of print per inch of vertical spacing.

PRINTER COLUMNS

1	2	3	4	5	6	7	8	9	10	11	12
					+	0	2	3	7	5	1
					-	1	1	6	2	3	2
					+	1	0	0	4	1	2
					+	0	7	4	1	3	4
					-	0	7	6	2	1	1
					-	0	9	3	3	6	3

Column 12 Range: 1 volt (1), 10 volt (2), 100 volt (3), 1000 volt (4)

Voltage Levels

Condition	Standard	Optional Extra		
"0"	0V	+6V	0V	-6V
"1"	-6V	0V	+6V	0V

Input impedance for all BCD inputs above is 15K ohms. The maximum input voltage positive is +15 volts; negative is -30 volts.

FEATURES

- **High Speed**
a digital voltmeter and high speed printer combination capable of logging data at 20 lines per second
- **Transistorized**
both voltmeter and printer employ all solid-state circuitry
- **Reliable**
The printer uses a unique and simple design assuring freedom from wear and breakdown
- **Flexible**
the system can be operated in several modes, depending on individual requirements
- **Versatile**
Seven to twelve columns for voltmeter and scanner data

Column 7-11 Reading: 4 digit measurement and 1 overrange digit.

Column 6	Function	Symbol
	-VDC	-
	+VDC	+
	Ohms	Ω 6101 only
	Overload	* 6001 and 6101 only

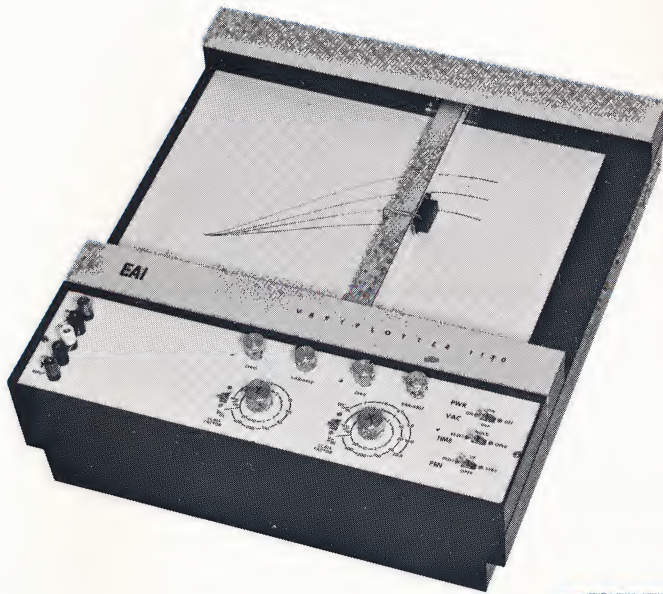
Column 1-5 Optional: These columns are available in single column increments.
The additional columns may be used for scanner address or other information.

INPUT LOGIC AND CHARACTERS

8, 4, 2, 1 code with the following characters: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, -, +, ~, Ω , *.

Columns 6-12 are supplied with voltage levels for interface with the Series 6000/6001/6101.

Columns 1-5 are available with voltage levels as follows:

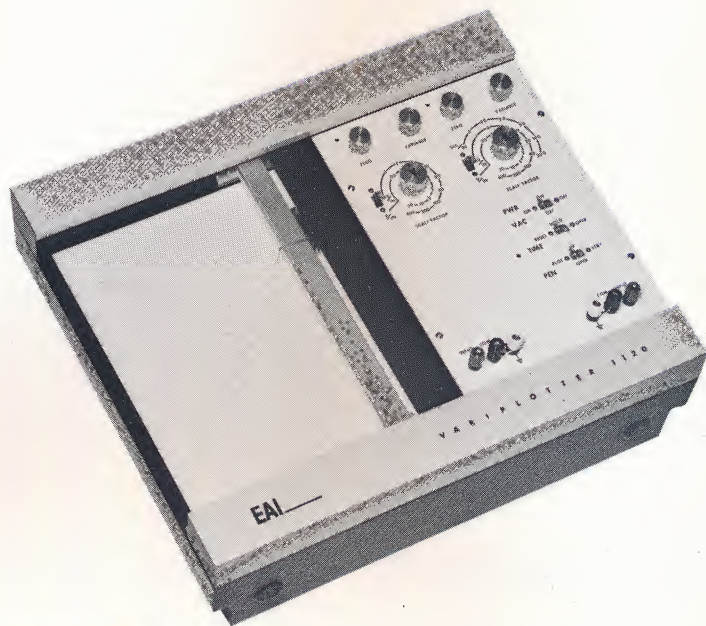


EAI—

1130

11" x 17"

PRICE \$1,790.00



8 1/2" x 11"

1120

PRICE \$1,450.00

Specifications — Series 1120 and 1130

RECORDING AREA:	Area	8" x 10"		10" x 15"	
	Series	1120	1120M	1130	1130M

ACCURACY:

Static:	±0.1%	Resetability:	±0.05%
Dynamic:	±0.2% @ 10 in./sec.	Time Base:	±3.0% on fixed ranges ±1.0% linearity

SLEWING SPEED: 20 inches/second (50 cm/sec) on each axis.

INPUT RANGES: Calibrated Ranges (a switch on each axis selects either Millivolt or Volt ranges.)

Series 1120 and 1130	
Millivolts/inch	Volts/inch
1	0.05
2	0.1
4	0.2
10	0.5
20	1.0
40	2.0
100	5.0
200	10.0
400	20.0

Series 1120M and 1130M	
Millivolts/Cent.	Volts/Cent.
0.5	0.025
1	0.05
2	0.1
5	0.25
10	0.5
20	1.0
50	2.5
100	5.0
200	10.0

A ten turn continuously variable vernier scale factor control is also provided on all models.

INPUT RESISTANCE:

Series 1120 and 1130: 25 megohms per volt on ranges up to 20 millivolts/inch and 1 megohm constant available above 40 millivolts/inch. Input impedance is not affected by adjustments of the variable scale factor control.

Series 1120M and 1130M (metric): 25 megohms per volt on ranges up to 10 millivolts per centimeter and 1 megohm constant available above 20 millivolts per centimeter. Input impedance is not affected by adjustment of the variable scale factor control.

INPUT CHARACTERISTICS: Isolated and free of ground for floating or single ended inputs.

TIME BASE RANGES:

Series 1120 and 1130: Calibrated sweeps of 0.5, 1, 2, 5, 10 and 20 seconds per inch. An uncalibrated vernier control permits between range settings and increased time sweeps to 50 seconds/inch on the 20 second/inch range.

Series 1120M and 1130M (metric): Calibrated sweeps of 0.25, 0.5, 1, 2.5, 5 and 10 seconds per centimeter. An uncalibrated vernier control permits between range settings and increased time sweeps to 25 seconds/cm. on the 10 second/cm. range.

ZERO ADJUSTMENT: Ten turn potentiometers permit precise on-board positioning or up to one full scale length of suppression on each axis.

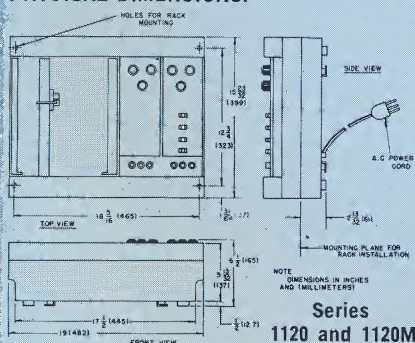
REFERENCE: Independent zener reference supplies are an integral part of the recorders electronic circuitry.

PLUG-IN FILTERS: 50/60 cycle attenuators installed under the control panels to permit smooth plotting of noisy input signals.

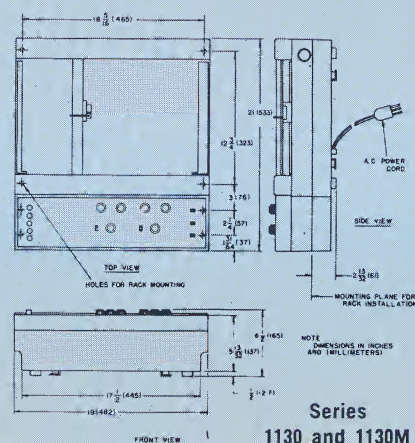
WEIGHT: Series 1120 and 1120M = 29 lbs.—(13 Kg.). Series 1130 and 1130M = 37 lbs.—(17 Kg.)

POWER REQUIREMENTS: 115/230 VAC ±5% @ 50/60 cps, 115 watts maximum.

PHYSICAL DIMENSIONS:



FINISH: Black case and trim; white control panel and plotting surface; and beige cover skins. Lettering is dark grey and controls are brushed aluminum.



PRICES:

Series 1120 or Series 1120M	\$1,450.00
Series 1130 or Series 1130M	\$1,790.00

ACCESSORIES:

Each recorder is supplied with two pens, 24 ink cartridges (red and green), pen cleaners, plug-in filters for each axis, 100 sheets of graph paper, and a protective dust cover.

Supplies

PEN ASSEMBLY: Used with Series 1120, 1120M, 1130, and 1130M Variplotters.

EAI Stock No.	Price
#378-0064-0	\$10.00

INK CARTRIDGES (Red): Plastic bottle containing collapsible red ink cartridges.

EAI Stock No.	Quantity	Price
#100-0013-0	12 Cartridges	\$6.00
#100-0013-2	24 Cartridges	\$9.95

INK CARTRIDGES (Green)

EAI Stock No.	Quantity	Price
#100-0013-1	12 Cartridges	\$6.00
#100-0013-3	24 Cartridges	\$9.95

RECORDING PAPERS*: All the recording papers are manufactured to special EAI tolerances under rigid quality control standards. The paper is printed and cut under controlled conditions to provide the greatest cross section and critical margin accuracies.

*All prices are for boxes of 100 sheets.

EAI Stock No.	Description	Price
955-0075-0	8 1/2" x 11"	\$3.25
955-0075-1	17 x 25 cm (metric)	\$3.25
955-0068-0	11" x 17"	\$5.00
955-0068-1	25 x 38 cm (metric)	\$5.50

All prices FOB, Long Branch, New Jersey.

Series 1110 Solid-State VARIPLOTTER®

RUGGED AND RELIABLE

ALL-SOLID-STATE

BLOWER TYPE VACUUM SYSTEM

STAINLESS STEEL ARM RAILS

HIGH STRENGTH ARM BEAM

TRANSFORMER COUPLED SERVOS

SUPERIOR ACCURACY AND PERFORMANCE

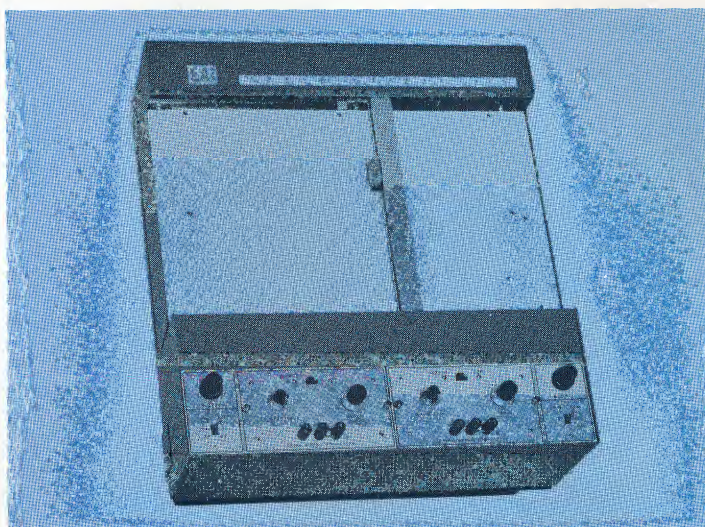
0.075% STATIC ACCURACY

0.05% REPEATABILITY

100 MICROVOLT/INCH SENSITIVITY

DUAL MODE HYDRAULIC DAMPING

CONTROLLED FLOW INK CARTRIDGE



SUPERIOR ACCURACY AND PERFORMANCE

Price — \$2,095.00

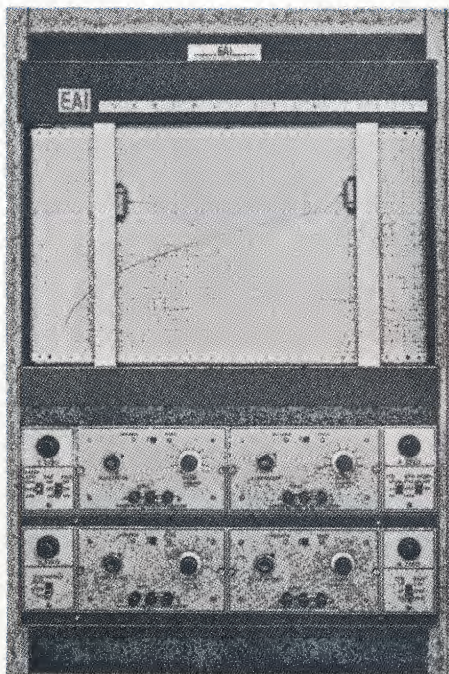
Series 1110

VARIPLOTTER

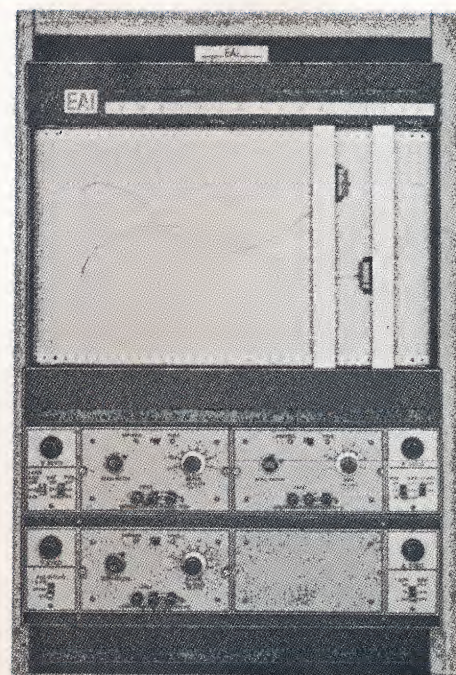
$X_1 Y_1 - X_2 Y_2$ Recorder

Features

- SIMULTANEOUSLY PLOTS TWO COMPLETELY INDEPENDENT CURVES.
- AUTOMATIC PEN INTERCHANGE
- FOUR INDEPENDENT SERVO SYSTEMS
- PLUS ALL THE FEATURES OF THE BASIC 1110 VARIPLOTTER



Price — \$4,750.00



Series 1110

VARIPLOTTER

$X - Y_1 Y_2$ Recorder

Features

- SIMULTANEOUSLY PLOTS TWO VARIABLES AGAINST A THIRD VARIABLE.
- NO DISPLACEMENT BETWEEN PLOTS.
- PLUS ALL THE FEATURES OF THE BASIC 1110 VARIPLOTTER.

Price — \$3,350.00

all-solid-state VARIPLOTTER

30" x 30" x-y plotting system Series 205

The Series 205 Transistorized VARIPLOTTER X-Y Plotting System by EAI provides fast, accurate and convenient plotting of any data that is available in d-c voltage form. A special model, capable of accepting 400 cps a-c voltage signals directly, is also available. Applicable to a wide variety of instrumentation systems, these versatile units have set the standard for performance, flexibility, and reliability in 30" x 30" X-Y plotters.

Designed for table-top, rack, or vertical wall mounting, the Series 205 Variplotter is available in both single and dual arm versions and will accept a large variety of accessories including timing pens, symbol printers, function generators and digital to analog converters. Several models are available for military applications and special requirements.

HIGH SPEED

... servo motors operate at 400
cps for high dynamic response

ACCURACY

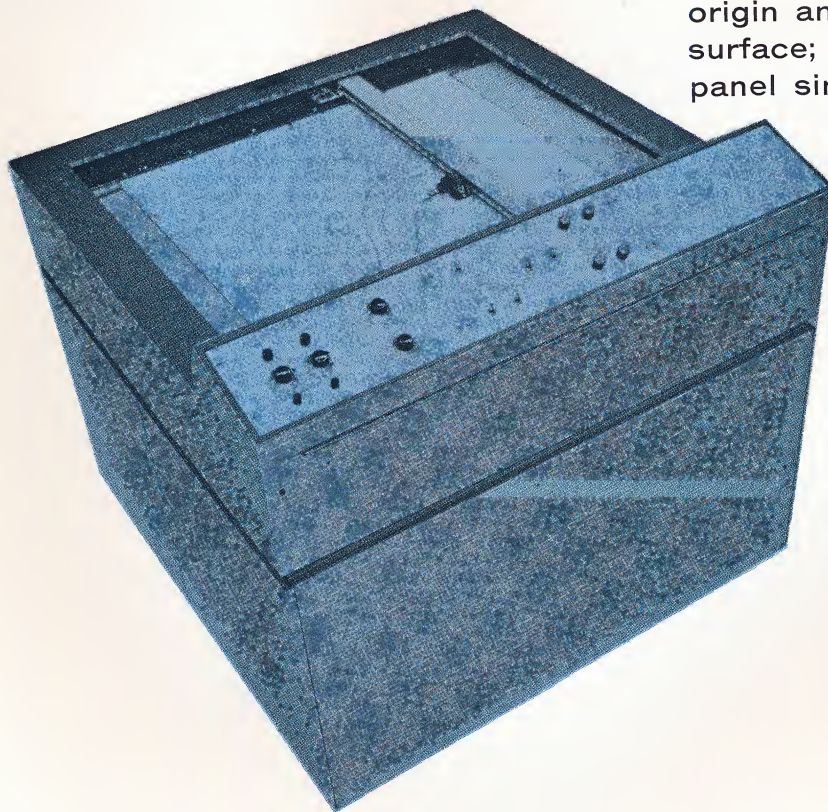
... static accuracy within $\pm 0.05\%$
dynamic accuracy within
 $\pm 0.05\%$ up to 20 inches
per second

RELIABILITY

... fully-transistorized circuits
are based on field-proven
design

VERSATILITY

... can be used in either vertical
or horizontal position, can
accommodate scale factor and
origin anywhere on plotting
surface; functional control
panel simplifies operation



ACCESSORY EQUIPMENT

The following accessories can be used with the Model 205 VARILOTTER X-Y Plotting System:

TIMING PENS

This optional equipment is mounted on the pen carriage(s) adjacent to the existing pen(s). Pips are recorded by the timing pen(s) adjacent to the curve to show 'real time' corresponding to the occurrence of a recorded phenomena, or the pens can be wired as operation indicators to record the occurrence of some external event.

AUTOMATIC PEN LIFT

Standard equipment on Dual Arm plotters, this feature causes the pen to be lifted when input signals change too rapidly due to a discontinuity in the data. The sensitivity is variable.

SYMBOL PRINTER

This feature permits the printing of up to 16 symbols

instead of the conventional inked line. Symbols can be selected remotely by electrical input command.

FUNCTION GENERATOR

With this accessory, a transistorized radio-frequency-pickup curve follower, the Model 205 plotter will produce an output voltage or resistance, Y, related to the input, X, by an arbitrary function, $Y=f(x)$.

OFF-BOARD PARALLAX

This feature permits setting the origin (0,0) position up to 30 in. off the board in any direction.

MIL SPECIFICATIONS

Several models are available for military applications, constructed in accordance with MIL Specifications, and with either 60 cps or 400 cps input power.

specifications

STATIC ACCURACY: within $\pm 0.05\%$.

DYNAMIC ACCURACY: Within $\pm 0.05\%$ at speeds up to 20 inches per second.

MAXIMUM VELOCITY: (Slewing Speed): 30 inches per second.

MAXIMUM ACCELERATION: Pen: 1500 inches per second per second. Arm: 350 inches per second per second.

PLOTTING AREA: 30 inches x 30 inches.

PAPER SIZE: $30\frac{1}{4}$ x $30\frac{1}{4}$ inches.

INPUT SENSITIVITY AND IMPEDANCE

Sensitivity (V/in.)	Impedance (K ohms)
0.05	7.5
0.1	15.0
0.25	37.5
0.5	75.0
1.0	150.0
2.5	375.0
5.0	750.0
10.0	1500.0

NETWORK RESISTOR ACCURACY: $\pm 0.02\%$

INPUT POWER:

117 volts, 60 cps standard. 117 volts, 50 cps and 220 volts, 50 cps available when specified.

MODEL 205T:

900 watts

MODEL 205S:

600 watts

WEIGHT:

Approximately 250 pounds (without stand)

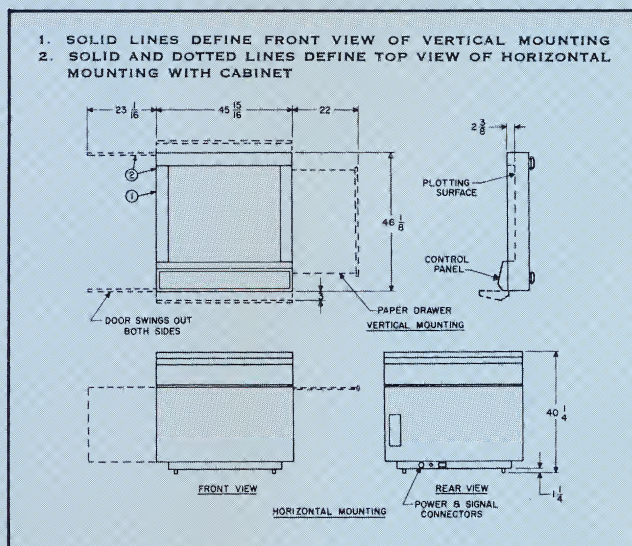


FIGURE 4-1: Dimension Drawing of Model 205 VARILOTTER X-Y Plotter.

Prices: F.O.B. Long Branch, N. J.

MODEL 205S \$6500.00, MODEL 205T \$8950.00

Stand for Horizontal Mounting \$500.00

Stand for Vertical Mounting \$550.00

SINGLE OR DUAL ARM MODELS

two models of the Series 205 VARIPLOTTER are available, each useable in either vertical or horizontal mounting

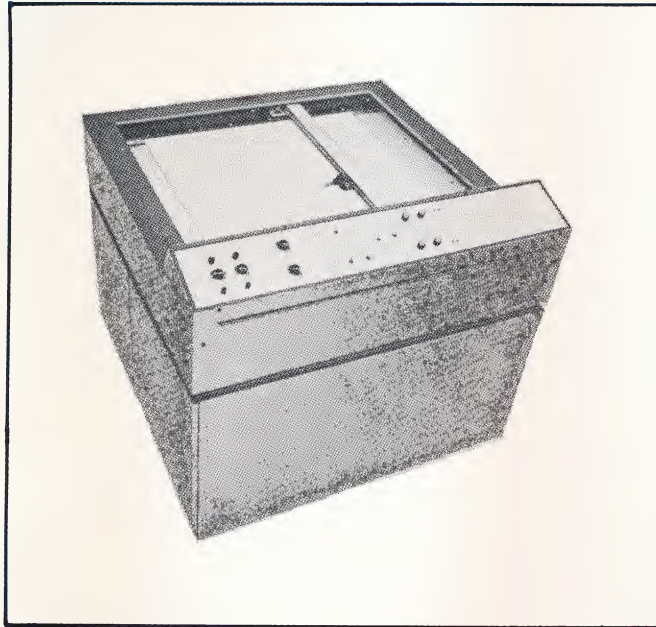


FIGURE 3-1 shows the single arm Model 205S. The cabinet shown is not included as part of the basic plotter, but is available as an accessory. Any stand or table approximately 42 in. square can be used for horizontal mounting of either model.

PEN INTERCHANGE

Two-arm models are provided with automatic pen interchange circuits. When the two curves being plotted cross each other, limit switches interchange servo inputs. Thus, both arms can plot curves over the entire 30 x 30 inch surface simultaneously.

VACUUM HOLD-DOWN

The vacuum paper hold-down system utilizes a heavy-duty vacuum pump which eliminates plot distortion caused by air bubbles, wrinkles or accidental paper dislocation.

ILLUMINATED PLOTTING SURFACE

Incandescent lighting is installed behind a fibreglas plotting surface to provide back lighting of the plot.

PEN LIFTER

Automatic pen-lift circuits in the plotter raise the pen from the plotting surface when not recording to prevent unwanted ink marks or stains. Pen lift occurs

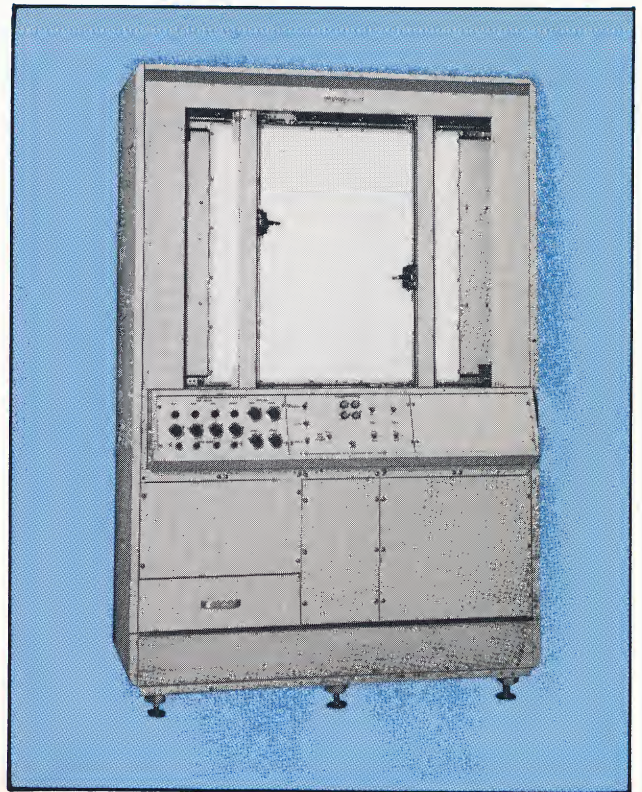


FIGURE 3-2 shows the Dual Arm model 205T.

when plotter power or vacuum switch is in OFF position, when pen-lift switch is in UP position, or when external contact release occurs with pen-lift switch in REMOTE position.

PEN SLEWING CONTROL

A standby slewing switch is a standard feature. It causes the pens to slew to the edge of the plotting surface for paper changing. The circuit can also be activated by contact closure in external equipment.

DISPOSABLE INK CARTRIDGE

Ink for up to 8 hours of intermittent operation is contained in a disposable ink cartridge.

INTERNAL REFERENCE VOLTAGE

High stability mercury batteries provide reference voltage for the servo motor followers. This eliminates the need for external reference connections, and permits plotting from single-ended or differential inputs.

Model 99.361

all-solid-state variplotter

45" x 60" x-y plotting system

The model 99.361 Transistorized VARIPLOTTER X-Y Plotting System by EAI records one variable voltage as a function of a second variable voltage. Highly accurate positioning of the writing instrument is achieved by utilizing drift-free, high-speed servo systems for each of the input variables. The resultant plot is in the form of inked lines on a plain or graph plotting sheet.

This new plotter may be fitted with a wide variety of auxiliary devices and accessories to provide additional flexibility. These devices include curve followers, function generating components, digital-to-analog converters, keyboards, and symbol printers.

specifications

PHYSICAL DESCRIPTION

Length 65 inches
Width 76 inches
Height 46 inches
Weight 1000 pounds

POWER REQUIREMENTS 115V, 60 Cps, 400W

DYNAMIC ACCURACY Depends on the type of damping

STATIC ACCURACY $\pm 0.03\%$

PLOTTING AREA 45 by 60 inches

MAXIMUM VELOCITY (Slewing Speed) ... 15 inches/second

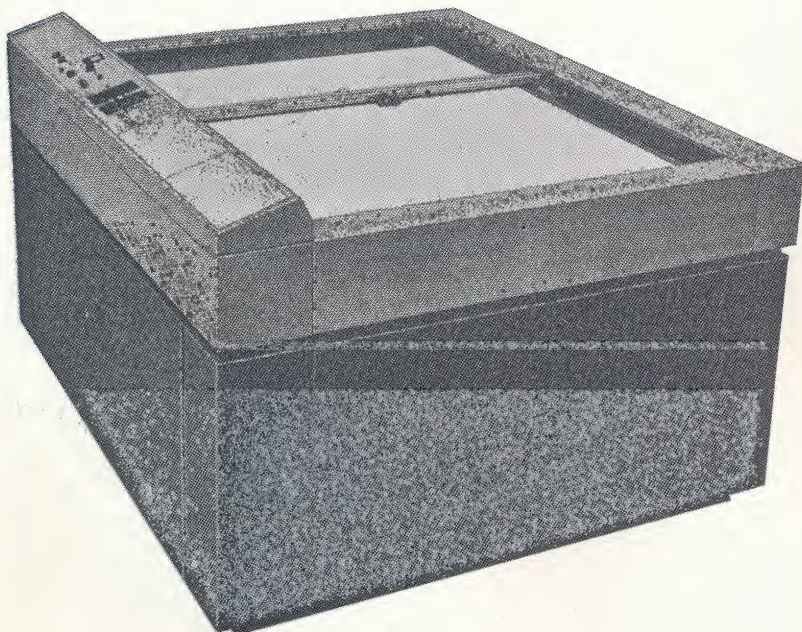
INPUT SENSITIVITY AND IMPEDANCE

Sensitivity (V/in.)	Impedance (K ohms)
0.05	7.5
0.1	15.0
0.25	37.5
0.5	75.0
1.0	150.0
2.5	375.0
5.0	750.0
10.0	1500.0

NETWORK RESISTOR ACCURACY: $\pm 0.02\%$

PRICES; F.O.B. LONG BRANCH, N.J.

Model 99.361 \$15,000.00
Stand for horizontal mounting \$800.00



features:

- **ACCURACY**
"Static accuracy within $\pm 0.03\%$ dynamic accuracy depends on damping."
- **HIGH SPEED**
"Servo motors operate at 400 cps for high dynamic response."
- **RELIABILITY**
"Fully transistorized circuits are based on field proven design."
- **BALL BEARING PEN CARRIAGE**
"Permits smooth contour and high speed digital plotting."

EAI[®]

ELECTRONIC ASSOCIATES, INC. • INSTRUMENT DIVISION



ELECTRONIC ASSOCIATES, INC., INSTRUMENT DIVISION, Long Branch, New Jersey, Tel. 201-229-4400, TWX 510-239-9208

THE COMPANY

Electronic Associates is a multi-million dollar company which has developed a line of XY Recording Equipment both Digital and Analog second to none. The Digital Voltmeter line originally conceived for use in the Analog Computer field now finds wide acceptance in the instrument business.

THE PRODUCT

A complete line of XY Recording Equipment both Digital and Analog having compatability with Data Reduction Equipment; a line of Digital Voltmeters suitable for small data acquisition use and necessary accessories.

ORDERING INFORMATION

TERMS: Net 30 Days
F.O.B. Point: Long Branch, N. J.
WARRANTY: 1 Year
HOW SHIP: Truck or Air
SPECIAL PAINT: Contact EAI
Instrument Division
EXTRA MANUALS: Prices vary —
Contact EAI Instrument Division

All prices and specifications subject to change without notice



all solid state digital voltmeters
Series 6000 and 6001

SERIES 6000 AND 6001

CONSTANT 1 MILLISECOND CONVERSION TIME

Whenever the Series 6000 or 6001 receive a conversion command, the instruments make a new measurement which is independent of the previous reading. The logic system used to make a conversion requires 16 trials for each new reading. There are four binary coded decimal (8, 4, 2, 1) resistors per decade and a logic system determines whether each of these resistors should be dropped or retained for a given reading. Therefore, only four trials are needed per decade and 16 trials per reading. These trials proceed at a minimum clock rate of approximately 22KC to give 16 trials plus command signals for one complete reading every millisecond.

TRIGGER RATES

The Series 6000 and 6001 make conversions in 1 millisecond, but the number of these conversions per second is determined by the trigger rate.

A front panel switch permits the operator to select two readings per second, 50 or 60 readings per second (depending on line frequency), manual trigger (a front panel push button initiates a single reading) or external (trigger from a system or from the internal clock at 1000 conversions per second).

TRACK AND READ VARYING SIGNALS

The Series 6000 and 6001 will track an input voltage and allow the user to follow the change visually or through the data outputs. Since the instruments take a completely new reading which is independent of null, they can be used to provide a series of accurate readings of a varying signal.

ACCURACY, RESOLUTION AND STABILITY

The Series 6000 and 6001 digital voltmeters are calibrated to $\pm 0.01\%$ of reading plus 1 digit absolute accuracy and provide full accuracy and 100 microvolt resolution at the 1000 conversion per second rate.

The accuracy of the Series 6000 and 6001 is designed into the instrument and based on proven reliable circuits. The maximum absolute error over a minimum of 6 months is guaranteed not to exceed $\pm 0.01\%$ of full scale plus 1 digit. This 6 month stability guarantee covers all factors which might contribute to error over the full operating temperature and humidity range, on all ranges and at all trigger rates. It takes into consideration linearity, internal zener reference, input and switching networks and even the factory calibration source.

No complex calculations are necessary to determine the accuracy of a particular reading, since the accuracy specification applies to all ranges and under all rated operating conditions.

Drift-Free Internal Reference

A stable voltage source consisting of a zener diode regulating network (with a temperature coefficient of 0.001% per °C and enclosed in a thermostatically controlled $\pm 1^\circ$ oven for maximum stability) connected across an electronically regulated +40 volt supply is applied to the input of a chopper stabilized operational amplifier. The amplifier is placed in series with a -100 volt supply (to enable the amplifier to handle the load requirements) and a feedback resistor is placed across the series combination. The ratio of input and feedback resistance causes the amplifier to adjust itself to produce precisely -100 volts output. The internal reference is calibrated with a test set which is referenced to a group of saturated mercury standard cells whose certified accuracy is 0.0001%.

"FULL TIME" HIGH INPUT IMPEDANCE

Unlike conventional chopper input voltmeters, the high input impedance of the Series 6000 and 6001 remains constant since it does not depend upon a null condition within the instrument. Through the use of a unique dual amplifier input unloading circuit, inputs from high source impedances can be measured with full assurance that no inaccuracies occur due to loading effects.

PROGRAMMING AND DATA OUTPUTS

The Series 6000 is designed to be completely programmed within a digital data acquisition system or partially programmed for special applications (i.e.: track and hold). One 78 pin data connector on the rear of the instrument contains all programming lines as well as binary coded decimal outputs and complements. Thus, in addition to the rear signal input connector, one connector serves for the majority of high speed data logging and systems applications. A second 78 pin connector at the rear of the instrument provides ten line decimal outputs.

The Series 6001 is identical to the Series 6000 with the added capability of automatic ranging.

DISPLAY

A new 5 digit In-Line in-Plane projection display provides four (4) times the brilliance of earlier units. This type of readout has generally been acknowledged as the easiest and least fatiguing to read. The display is easily read even under high ambient light conditions.

SYSTEM ACCESSORIES

A complete line of input/output accessories are available for use with the Series 6000 and 6001 digital voltmeters. Included are input scanners, signal conditioners, a digital computer, printers and parallel-to-serial converters to drive tape and card punches. Write or call your EAI representative for information.

RANGES AND INPUT IMPEDANCE—SERIES 6000 AND 6001

Range (Volts)		Input Impedance (Megohms)*	
Nominal	Overrange	Constant	Maximum
1	1.1999	10	250
10	11.999	10	500
100	119.99	10	10
1000	1199.9	10	10

INPUT CIRCUIT

Front and rear panel input connectors permit convenient use either in a system or on a work bench. Signal pair may be floated up to 500 volts above chassis ground. Triaxial input connectors provide excellent signal pair shielding.

* A front panel switch permits the selection of either constant input impedance or maximum input impedance. In the maximum position, an internal adjustment permits setting the input circuit to greater than 1000 megohms on the 1 and 10 volt ranges.

Series 6000 Manual and Programmable Ranging

Selection of ranges accomplished by a front panel switch or remote circuit closures to ground, applied at rear programming connector.

Series 6001 Manual, Programmable, and Automatic Ranging

In addition to manual or remote programmed ranging, the Series 6001 provides complete automatic ranging capability. The automatic ranging mode is selected by a front panel switch or remote circuit closures to ground, applied at the rear programming connector.

Range Change Points.

Upranges at 120% of full scale.
Downranges at 10% of full scale.

Range Change Time

Range change time is 390 milliseconds (includes polarity change).

MAXIMUM CONVERSION TIME

Constant one (1) millisecond per measurement in a single range and polarity; 35 milliseconds worst case with polarity change and 390 milliseconds in automatic ranging mode with both range and polarity change.

The internal clock operates between 22 Kc for 1 millisecond conversion time and 28 Kc for .7 millisecond conversion time. The minimum clock rate is 22 Kc for a maximum conversion time of 1 millisecond.

TRIGGER AND DISPLAY RATE

A front panel trigger switch permits the selection of four different reading (trigger) modes.

Internal Low: Provides approximately 2 readings per second. Each measurement is made in the time specified under maximum conversion time above and displayed for the remainder (conversion in 1MS and display for 499 MS).

Internal High: Provides 60 or 50 readings per second (with conversion in 1 MS and display for 16 MS or 19 MS) depending on line frequency.

External: Provides conversion at an externally selected rate up to 1000 per second. The 1000 conversion per second rate can be triggered by an internal clock, which is available on the programming connector at the rear of the instrument.

Manual: Converts in 1 MS and displays until the manual push button is depressed, at which time another conversion occurs.

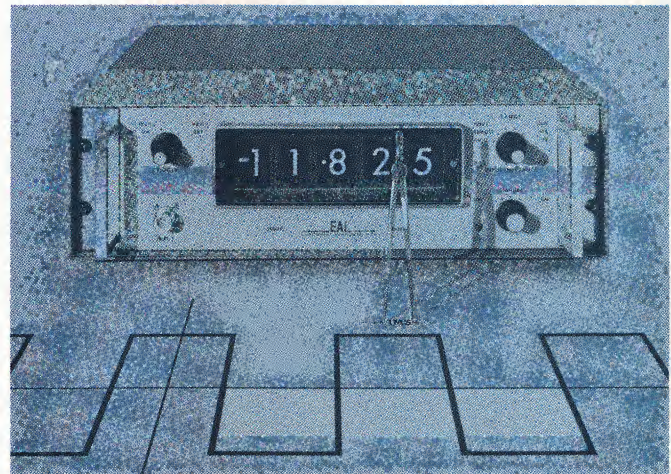
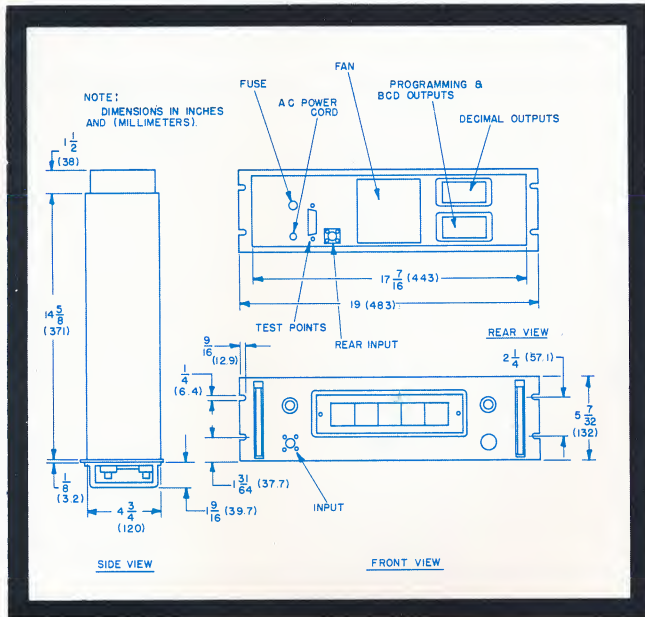
ELECTRICAL OUTPUTS

Complete systems output and control connections are available on two connectors at the rear of the instrument. Binary coded decimal outputs and programming lines are available on one 78 pin connector and decimal outputs are available on another 78 pin connector.

Binary Coded Decimal Outputs

BCD outputs are 8-4-2-1 logic

DIMENSIONS - Series 6000 and 6001



POWER

115/230 volts $\pm 10\%$, 50 to 60 cps, approximately 100 watts, 120 VA.

WEIGHT

Net wt. 31 lbs. (14 Kg); shipping wt. 50 lbs. (23 Kg).
When ordered with optional cabinet: Net wt. 44 lbs. (20 Kg); shipping wt. 57 lbs. (26 Kg).

PANEL FINISH

Light beige baked enamel. Black control titles and black bezel and controls with brushed aluminum handles and trim.

OPTIONS

(Order by underlined description)

Programmable Filter #1—Provides 60 DB of common and normal mode rejection at 60 cps—1 second settling time. **Price \$195.00**

Programmable Filter #2—Provides 40 Db of common and normal mode rejection at 60 cps—300 milli-seconds settling time. **Price \$195.00**

Protective Case for benchtop use **Price 45.00**

Special paint finishes available **on request**

ACCESSORIES

(Order by Stock Number)

Extender Board (for servicing plug in circuit boards). EAI Stock No. 51-160. **Price \$25.00**

Programmer Input and BCD Data Output Connector

(Cannon DPD-78-34-1L) 78 pin connector EAI Stock No. 542-125.

Price \$7.90

Decimal Data Output Connector (Cannon DPD-78-34P-1L) 78 pin connector. EAI Stock No. 542-125. **Price \$7.90**

Cover Hood for Connectors Above (Cannon DPD-34J/s-12172) EAI Stock No. 198-161. **Price \$2.00**

PRICES

SERIES 6000

Manual and Programmable Ranging Digital Voltmeter **\$2,950**

SERIES 6001

Automatic Manual and Programmable Ranging Digital Voltmeter **\$3,450**

Instruments are supplied with chassis shields and input connector and cable.

high speed printer accessory



SYSTEM SPECIFICATIONS Series 6610

PRINTING FORMAT

Prints 10 characters per inch across the paper and 6 lines of print per inch of vertical spacing.

PRINTER COLUMNS

1	2	3	4	5	6	7	8	9	10	11	12
					+	0	2	3	7	5	1
					-	1	1	6	2	3	2
					+	1	0	0	4	1	2
					+	0	7	4	1	3	4
					-	0	7	6	2	1	1
					-	0	9	3	3	6	3

Column 12 Range: 1 volt (1), 10 volt (2), 100 volt (3), 1000 volt (4)

Voltage Levels

Condition	Standard	Optional Extra		
"0"	0V	+6V	0V	-6V
"1"	-6V	0V	+6V	0V

Input impedance for all BCD inputs above is 15K ohms. The maximum input voltage positive is +15 volts; negative is -30 volts.

FEATURES

- **High Speed**
a digital voltmeter and high speed printer combination capable of logging data at 20 lines per second
- **Transistorized**
both voltmeter and printer employ all solid-state circuitry
- **Reliable**
The printer uses a unique and simple design assuring freedom from wear and breakdown
- **Flexible**
the system can be operated in several modes, depending on individual requirements
- **Versatile**
Seven to twelve columns for voltmeter and scanner data

Column 7-11 Reading: 4 digit measurement and 1 overrange digit.

Column 6	Function	Symbol
	-VDC	-
	+VDC	+
	Ohms	Ω 6101 only
	Overload	* 6001 and 6101 only

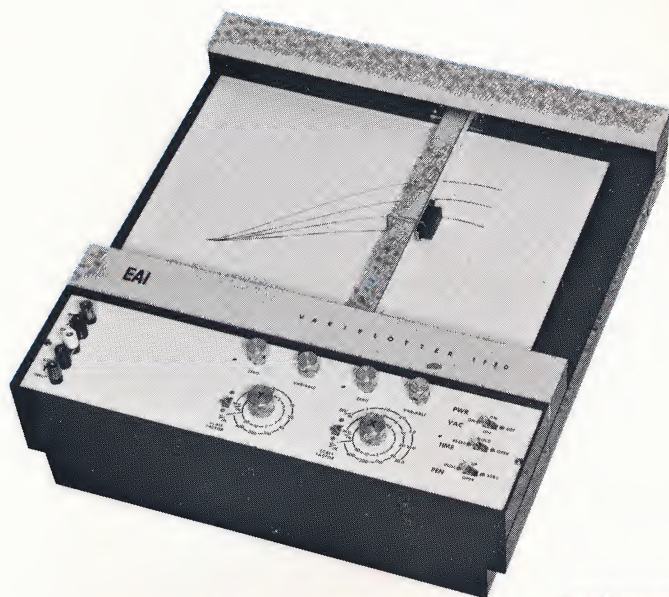
Column 1-5 Optional: These columns are available in single column increments.
The additional columns may be used for scanner address or other information.

INPUT LOGIC AND CHARACTERS

8, 4, 2, 1 code with the following characters: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, -, +, ~, Ω , *.

Columns 6-12 are supplied with voltage levels for interface with the Series 6000/6001/6101.

Columns 1-5 are available with voltage levels as follows:

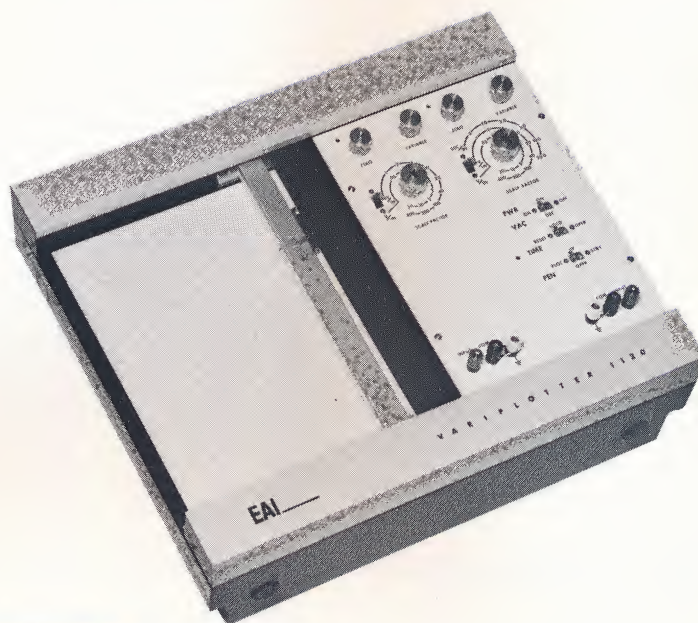


EAI—

1130

11" x 17"

PRICE \$1,790.00



8 1/2" x 11"

1120

PRICE \$1,450.00

Specifications — Series 1120 and 1130

RECORDING AREA:	Area	8" x 10"		10" x 15"	
	Series	1120	1120M	1130	1130M

ACCURACY:

Static: $\pm 0.1\%$
Dynamic: $\pm 0.2\%$ @ 10 in./sec.

Resetability: $\pm 0.05\%$
Time Base: $\pm 3.0\%$ on fixed ranges
 $\pm 1.0\%$ linearity

SLEWING SPEED: 20 inches/second (50 cm/sec) on each axis.

INPUT RANGES: Calibrated Ranges (a switch on each axis selects either Millivolt or Volt ranges.)

Series 1120 and 1130	
Millivolts/inch	Volts/inch
1	0.05
2	0.1
4	0.2
10	0.5
20	1.0
40	2.0
100	5.0
200	10.0
400	20.0

Series 1120M and 1130M	
Millivolts/Cent.	Volts/Cent.
0.5	0.025
1	0.05
2	0.1
5	0.25
10	0.5
20	1.0
50	2.5
100	5.0
200	10.0

A ten turn continuously variable vernier scale factor control is also provided on all models.

INPUT RESISTANCE:

Series 1120 and 1130: 25 megohms per volt on ranges up to 20 millivolts/inch and 1 megohm constant available above 40 millivolts/inch. Input impedance is not affected by adjustments of the variable scale factor control.

Series 1120M and 1130M (metric): 25 megohms per volt on ranges up to 10 millivolts per centimeter and 1 megohm constant available above 20 millivolts per centimeter. Input impedance is not affected by adjustment of the variable scale factor control.

INPUT CHARACTERISTICS: Isolated and free of ground for floating or single ended inputs.

TIME BASE RANGES:

Series 1120 and 1130: Calibrated sweeps of 0.5, 1, 2, 5, 10 and 20 seconds per inch. An uncalibrated vernier control permits between range settings and increased time sweeps to 50 seconds/inch on the 20 second/inch range.

Series 1120M and 1130M (metric): Calibrated sweeps of 0.25, 0.5, 1, 2.5, 5 and 10 seconds per centimeter. An uncalibrated vernier control permits between range settings and increased time sweeps to 25 seconds/cm. on the 10 second/cm. range.

ZERO ADJUSTMENT: Ten turn potentiometers permit precise on-board positioning or up to one full scale length of suppression on each axis.

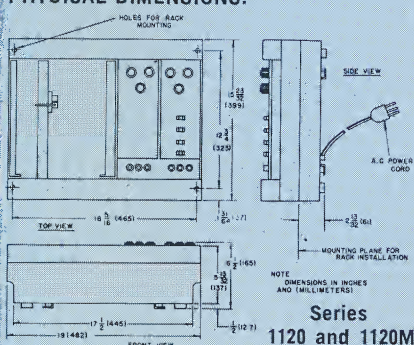
REFERENCE: Independent zener reference supplies are an integral part of the recorders electronic circuitry.

PLUG-IN FILTERS: 50/60 cycle attenuators installed under the control panels to permit smooth plotting of noisy input signals.

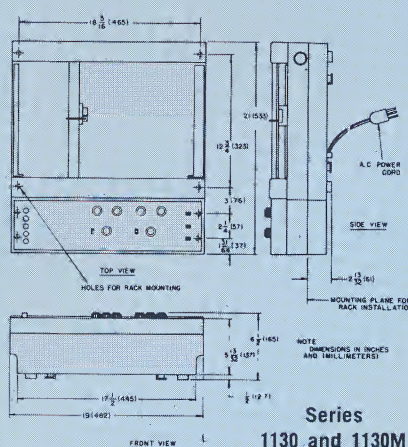
WEIGHT: Series 1120 and 1120M = 29 lbs.—(13 Kg.). Series 1130 and 1130M = 37 lbs.—(17 Kg.)

POWER REQUIREMENTS: 115/230 VAC $\pm 5\%$ @ 50/60 cps, 115 watts maximum.

PHYSICAL DIMENSIONS:



FINISH: Black case and trim; white control panel and plotting surface; and beige cover skins. Lettering is dark grey and controls are brushed aluminum.



PRICES:

Series 1120 or Series 1120M	\$1,450.00
Series 1130 or Series 1130M	\$1,790.00

ACCESSORIES:

Each recorder is supplied with two pens, 24 ink cartridges (red and green), pen cleaners, plug-in filters for each axis, 100 sheets of graph paper, and a protective dust cover.

Supplies

PEN ASSEMBLY: Used with Series 1120, 1120M, 1130, and 1130M Variplotters.

EAI Stock No.	Price
#378-0064-0	\$10.00

INK CARTRIDGES (Red): Plastic bottle containing collapsible red ink cartridges.

EAI Stock No.	Quantity	Price
#100-0013-0	12 Cartridges	\$6.00
#100-0013-2	24 Cartridges	\$9.95

INK CARTRIDGES (Green)

EAI Stock No.	Quantity	Price
#100-0013-1	12 Cartridges	\$6.00
#100-0013-3	24 Cartridges	\$9.95

RECORDING PAPERS*: All the recording papers are manufactured to special EAI tolerances under rigid quality control standards. The paper is printed and cut under controlled conditions to provide the greatest cross section and critical margin accuracies.

*All prices are for boxes of 100 sheets.

EAI Stock No.	Description	Price
955-0075-0	8½" x 11"	\$3.25
955-0075-1	17 x 25 cm (metric)	\$3.25
955-0068-0	11" x 17"	\$5.00
955-0068-1	25 x 38 cm (metric)	\$5.50

All prices FOB, Long Branch, New Jersey.

Series 1110 Solid-State VARIPLOTTER®

RUGGED AND RELIABLE

ALL-SOLID-STATE

BLOWER TYPE VACUUM SYSTEM

STAINLESS STEEL ARM RAILS

HIGH STRENGTH ARM BEAM

TRANSFORMER COUPLED SERVOS

SUPERIOR ACCURACY AND PERFORMANCE

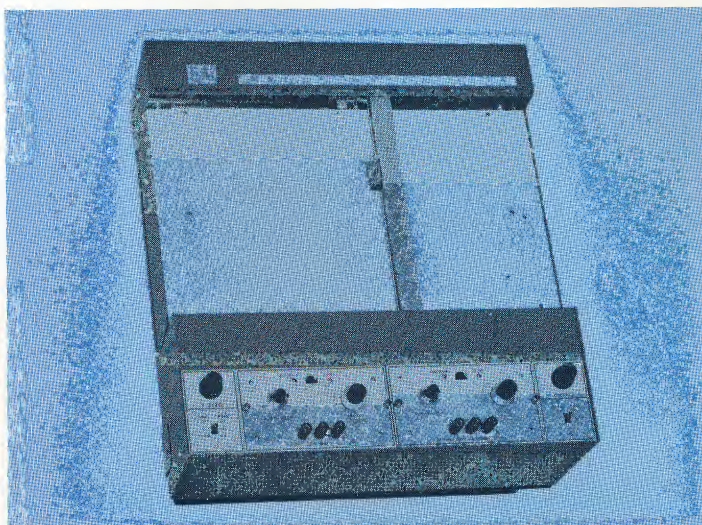
0.075% STATIC ACCURACY

0.05% REPEATABILITY

100 MICROVOLT/INCH SENSITIVITY

DUAL MODE HYDRAULIC DAMPING

CONTROLLED FLOW INK CARTRIDGE



SUPERIOR ACCURACY AND PERFORMANCE

Price — \$2,095.00

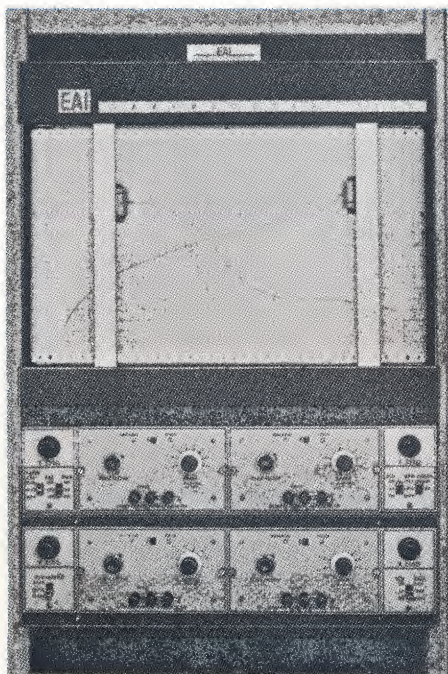
Series 1110

VARIPLOTTER

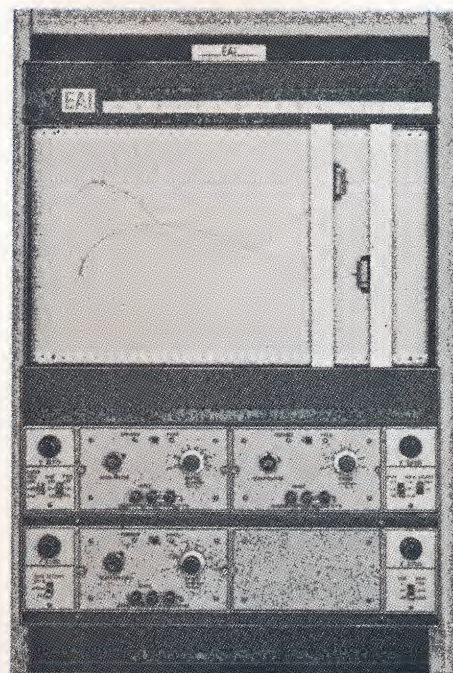
$X_1 Y_1 - X_2 Y_2$ Recorder

Features

- SIMULTANEOUSLY PLOTS TWO COMPLETELY INDEPENDENT CURVES.
- AUTOMATIC PEN INTERCHANGE
- FOUR INDEPENDENT SERVO SYSTEMS
- PLUS ALL THE FEATURES OF THE BASIC 1110 VARIPLOTTER



Price — \$4,750.00



Series 1110

VARIPLOTTER

$X - Y_1 Y_2$ Recorder

Features

- SIMULTANEOUSLY PLOTS TWO VARIABLES AGAINST A THIRD VARIABLE.
- NO DISPLACEMENT BETWEEN PLOTS.
- PLUS ALL THE FEATURES OF THE BASIC 1110 VARIPLOTTER.

Price — \$3,350.00

all-solid-state VARIPLOTTER

30" x 30" x-y plotting system Series 205

The Series 205 Transistorized VARIPLOTTER X-Y Plotting System by EAI provides fast, accurate and convenient plotting of any data that is available in d-c voltage form. A special model, capable of accepting 400 cps a-c voltage signals directly, is also available. Applicable to a wide variety of instrumentation systems, these versatile units have set the standard for performance, flexibility, and reliability in 30" x 30" X-Y plotters.

Designed for table-top, rack, or vertical wall mounting, the Series 205 Variplotter is available in both single and dual arm versions and will accept a large variety of accessories including timing pens, symbol printers, function generators and digital to analog converters. Several models are available for military applications and special requirements.

HIGH SPEED

... servo motors operate at 400
cps for high dynamic response

ACCURACY

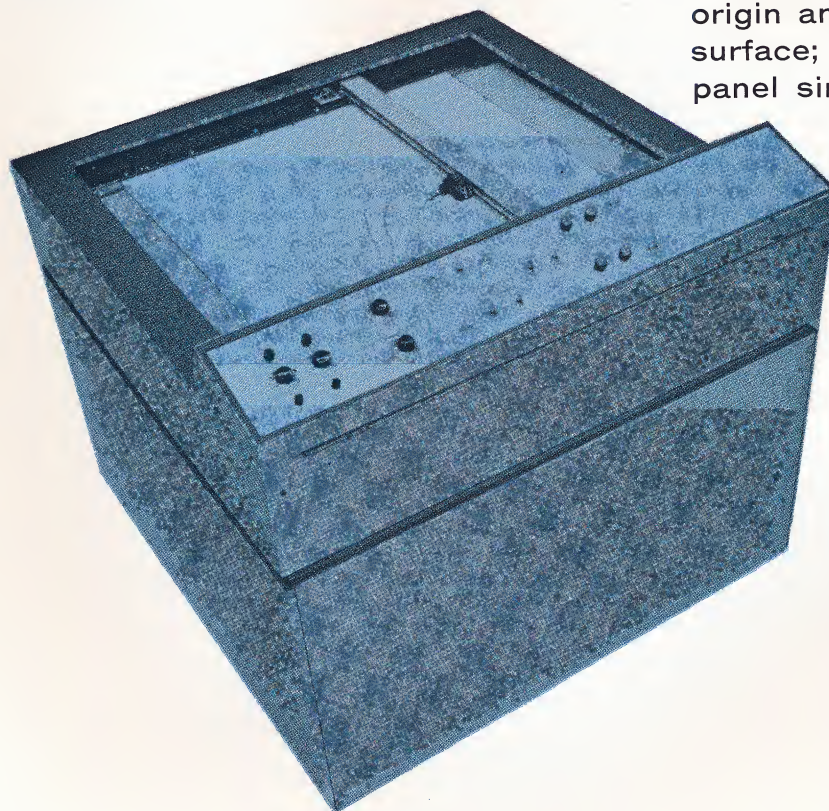
... static accuracy within $\pm 0.05\%$
dynamic accuracy within
 $\pm 0.05\%$ up to 20 inches
per second

RELIABILITY

... fully-transistorized circuits
are based on field-proven
design

VERSATILITY

... can be used in either vertical
or horizontal position, can
accommodate scale factor and
origin anywhere on plotting
surface; functional control
panel simplifies operation



ACCESSORY EQUIPMENT

The following accessories can be used with the Model 205 VARIPLOTTER X-Y Plotting System:

TIMING PENS

This optional equipment is mounted on the pen carriage(s) adjacent to the existing pen(s). Pips are recorded by the timing pen(s) adjacent to the curve to show 'real time' corresponding to the occurrence of a recorded phenomena, or the pens can be wired as operation indicators to record the occurrence of some external event.

AUTOMATIC PEN LIFT

Standard equipment on Dual Arm plotters, this feature causes the pen to be lifted when input signals change too rapidly due to a discontinuity in the data. The sensitivity is variable.

SYMBOL PRINTER

This feature permits the printing of up to 16 symbols

instead of the conventional inked line. Symbols can be selected remotely by electrical input command.

FUNCTION GENERATOR

With this accessory, a transistorized radio-frequency-pickup curve follower, the Model 205 plotter will produce an output voltage or resistance, Y , related to the input, X , by an arbitrary function, $Y=f(x)$.

OFF-BOARD PARALLAX

This feature permits setting the origin (0,0) position up to 30 in. off the board in any direction.

MIL SPECIFICATIONS

Several models are available for military applications, constructed in accordance with MIL Specifications, and with either 60 cps or 400 cps input power.

specifications

STATIC ACCURACY: within $\pm 0.05\%$.

DYNAMIC ACCURACY: Within $\pm 0.05\%$ at speeds up to 20 inches per second.

MAXIMUM VELOCITY: (Slewing Speed): 30 inches per second.

MAXIMUM ACCELERATION: Pen: 1500 inches per second per second. Arm: 350 inches per second per second.

PLOTTING AREA: 30 inches x 30 inches.

PAPER SIZE: $30\frac{1}{4}$ x $30\frac{1}{4}$ inches.

INPUT SENSITIVITY AND IMPEDANCE

Sensitivity (V/in.)	Impedance (K ohms)
0.05	7.5
0.1	15.0
0.25	37.5
0.5	75.0
1.0	150.0
2.5	375.0
5.0	750.0
10.0	1500.0

NETWORK RESISTOR ACCURACY: $\pm 0.02\%$

INPUT POWER:

117 volts, 60 cps standard. 117 volts, 50 cps and 220 volts, 50 cps available when specified.

MODEL 205T:

900 watts

MODEL 205S:

600 watts

WEIGHT:

Approximately 250 pounds (without stand)

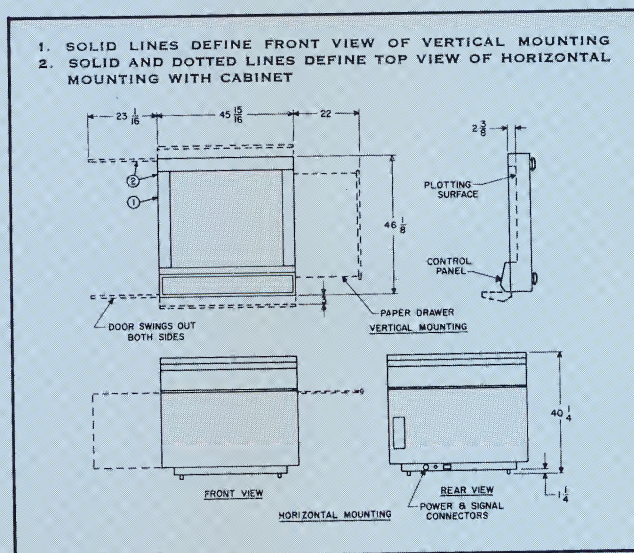


FIGURE 4-1: Dimension Drawing of Model 205 VARIPLOTTER X-Y Plotter.

Prices: F.O.B. Long Branch, N. J.

MODEL 205S \$6500.00, MODEL 205T \$8950.00

Stand for Horizontal Mounting \$500.00

Stand for Vertical Mounting \$550.00

SINGLE OR DUAL ARM MODELS

two models of the Series 205 VARIPLOTTER are available, each useable in either vertical or horizontal mounting

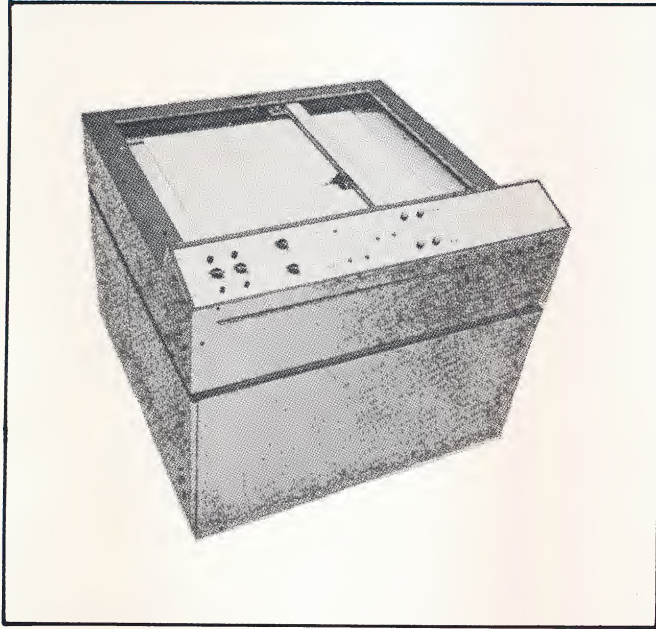


FIGURE 3-1 shows the single arm Model 205S. The cabinet shown is not included as part of the basic plotter, but is available as an accessory. Any stand or table approximately 42 in. square can be used for horizontal mounting of either model.

PEN INTERCHANGE

Two-arm models are provided with automatic pen interchange circuits. When the two curves being plotted cross each other, limit switches interchange servo inputs. Thus, both arms can plot curves over the entire 30 x 30 inch surface simultaneously.

VACUUM HOLD-DOWN

The vacuum paper hold-down system utilizes a heavy-duty vacuum pump which eliminates plot distortion caused by air bubbles, wrinkles or accidental paper dislocation.

ILLUMINATED PLOTTING SURFACE

Incandescent lighting is installed behind a fibreglas plotting surface to provide back lighting of the plot.

PEN LIFTER

Automatic pen-lift circuits in the plotter raise the pen from the plotting surface when not recording to prevent unwanted ink marks or stains. Pen lift occurs

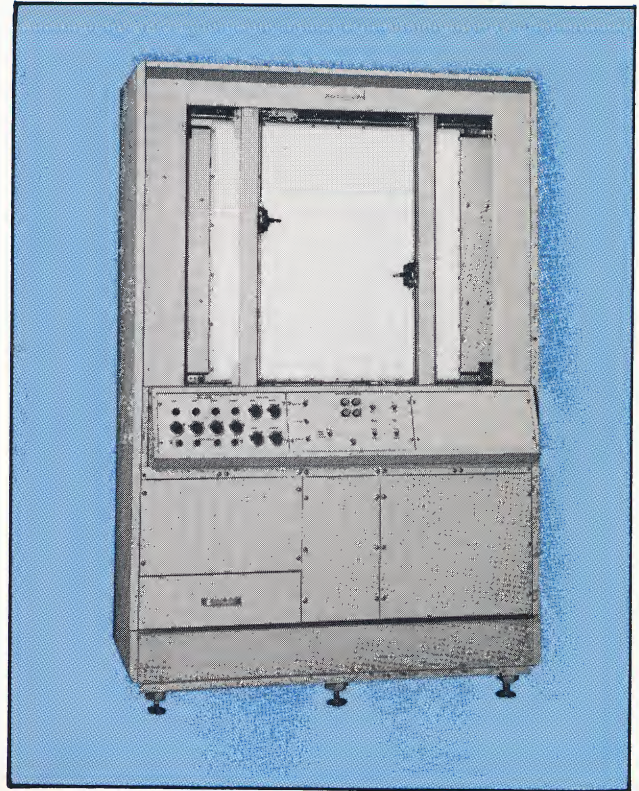


FIGURE 3-2 shows the Dual Arm model 205T.

when plotter power or vacuum switch is in OFF position, when pen-lift switch is in UP position, or when external contact release occurs with pen-lift switch in REMOTE position.

PEN SLEWING CONTROL

A standby slewing switch is a standard feature. It causes the pens to slew to the edge of the plotting surface for paper changing. The circuit can also be activated by contact closure in external equipment.

DISPOSABLE INK CARTRIDGE

Ink for up to 8 hours of intermittent operation is contained in a disposable ink cartridge.

INTERNAL REFERENCE VOLTAGE

High stability mercury batteries provide reference voltage for the servo motor followers. This eliminates the need for external reference connections, and permits plotting from single-ended or differential inputs.

Model 99.361

all-solid-state variplotter

45" x 60" x-y plotting system

The model 99.361 Transistorized VARIPLOTTER X-Y Plotting System by EAI records one variable voltage as a function of a second variable voltage. Highly accurate positioning of the writing instrument is achieved by utilizing drift-free, high-speed servo systems for each of the input variables. The resultant plot is in the form of inked lines on a plain or graph plotting sheet.

This new plotter may be fitted with a wide variety of auxiliary devices and accessories to provide additional flexibility. These devices include curve followers, function generating components, digital-to-analog converters, keyboards, and symbol printers.

specifications

PHYSICAL DESCRIPTION

Length 65 inches
Width 76 inches
Height 46 inches
Weight 1000 pounds

POWER REQUIREMENTS 115V, 60 Cps, 400W

DYNAMIC ACCURACY Depends on the type of damping

STATIC ACCURACY $\pm 0.03\%$

PLOTTING AREA 45 by 60 inches

MAXIMUM VELOCITY (Slewing Speed) ... 15 inches/second

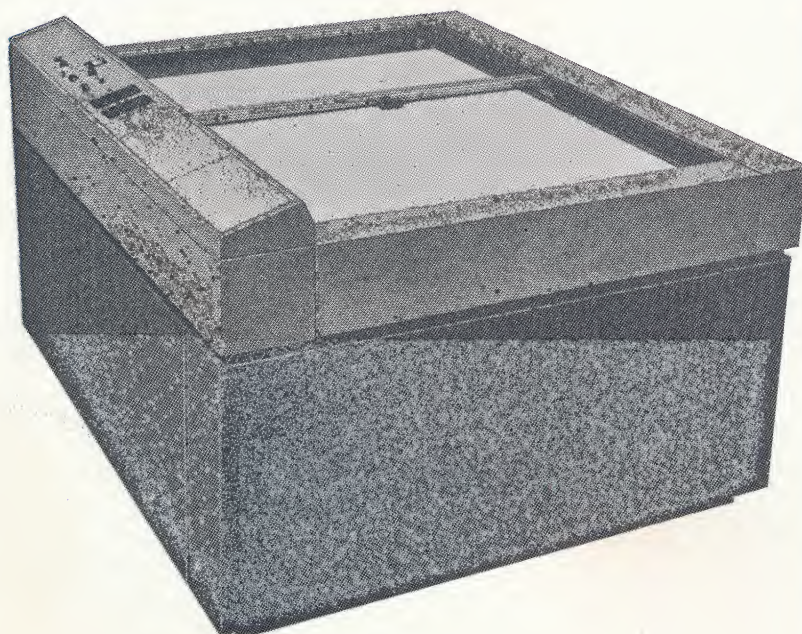
INPUT SENSITIVITY AND IMPEDANCE

Sensitivity (V/in.)	Impedance (K ohms)
0.05	7.5
0.1	15.0
0.25	37.5
0.5	75.0
1.0	150.0
2.5	375.0
5.0	750.0
10.0	1500.0

NETWORK RESISTOR ACCURACY: $\pm 0.02\%$

PRICES; F.O.B. LONG BRANCH, N.J.

Model 99.361 \$15,000.00
Stand for horizontal mounting \$800.00



features:

■ ACCURACY

"Static accuracy within $\pm 0.03\%$ dynamic accuracy depends on damping."

■ HIGH SPEED

"Servo motors operate at 400 cps for high dynamic response."

■ RELIABILITY

"Fully transistorized circuits are based on field proven design."

■ BALL BEARING PEN CARRIAGE

"Permits smooth contour and high speed digital plotting."